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PROJECT FOR AN AUTOMATED PRIMARY-GRADE READING AND ARITHMETIC CURRICULUM FOR CULTURALLY-DEPRIVED CHILDREN. PROGRESS REPORT NUMBER 5, JULY 1 TO DECEMBER 31, 1966.

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THIS REPORT ON THE PROGRESS OF THE IBM 1800/1500 CAI SYSTEM, AN AUTOMATED READING AND ARITHMETIC CURRICULUM FOR CULTURALLY DEPRIVED CHILDREN IN THE PRIMARY GRADES, DISCUSSES THE PROBLEMS INVOLVED IN GETTING THE SYSTEM INTO OPERATION IN THE BRENTWOOD SCHOOL IN STANFORD, CALIF. THE OPERATIONAL FEATURES OF THIS IBM SYSTEM AND THE METHODS BY WHICH THE CHILDREN WERE INTRODUCED TO THE LABORATORY AND ITS MATERIALS ARE ALSO DESCRIBED. THE READING AND ARITHMETIC CURRICULUMS ARE BEING USED IN BOTH THE CLASSROOM AND THE LABORATORY, AND THE RESPONSE OF THE CHILDREN, DESPITE THE BREAKDOWNS OF THE EQUIPMENT, HAS BEEN "ENTHUSIASTIC." SUCCESS FEATURES HAVE BEEN BUILT INTO THE PROGRAMED MATERIALS, MANY OF WHICH DO NOT REQUIRE THE VERBALIZATION SKILLS IN WHICH DISADVANTAGED YOUNGSTERS ARE DEFICIENT. VARIOUS NEWS MEDIA HAVE REPORTED THIS COMPUTERIZED PROGRAM. (NH)

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PROJECT FOR AN AUTOMATED PRIMARY-GRADE READING AND ARITHMETIC CURRICULUM FOR CULTURALLY-DEPRIVED CHILDREN

FOR THE PERIOD

JULY 1, 1966 TO DECEMBER 31, 1966

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PROGRESS REPORT NUMBER 5

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JULY 1, 1966 TO DECEMBER 31, 1966

1. Major Activities of this Reporting Period. The major activities of this reporting period have centered around the installation, debugging, and initial operation of the IBM 1800/1500 CAI System. The curriculum effort has been concentrated on coding and debugging lesson materials and on establishing a systematic routine for the presentation of the material to the students.

A. Implementation of the CAI System. The IBM 1800/1500 System was delivered on July 10, 1966, to the Brentwood CAI Laboratory. The remainder of the month of July was spent in the installation and adjustment of the central processing unit and its peripheral hardward components. The focus of the programming effort in early August was on the debugging of the system's programs. As the system has gradually stabilized, the curriculum program debugging effort has increased.

Problems encountered in the debugging effort caused the target date for the initiation of instruction on the system to be set back to November 1, 1966. IBM field engineers have worked in close collaboration with the Stanford-Brentwood systems personnel throughout the debugging effort. Progress towards system stability has increased gradually and continuously over this reporting period. Software systems and operating procedures have been modified and improved on the basis of feedback from actual student use. The basic programs have been implemented to provide the reports necessary for daily operation and weekly information for the classroom teachers regarding individual student's progress.

Hardware and concurrent programming modifications to the disc file system were made at the end of December. These modifications keep the Stanford-Brentwood system consistent with the IBM product-line. Progress has been reported by the IBM software group toward fixing a known bug in the scheduler which now prohibits the use of multiple course packs. The new schedular is expected to be installed early in January, 1967.

The laboratory is now operating on a 24-hour schedule. The bulk of the daytime hours are occupied by student use with some sharing with systems and

data personnel. Late afternoon and evening hours are used for curriculum program debugging, and the period from midnight until eight a.m. is used for audio and course assembly. See Fig. 1 System Schedule, page 2-a.

B. Student Use of the Laboratory. The first-grade enrollment at the Brentwood School is approximately one hundred students divided among four classrooms. Two of the classrooms are receiving reading and two are receiving mathematics instruction daily at the Laboratory. Student use of the Laboratory began in October with preliminary activities being carried out in the classroom adjacent to the terminal room.

Students were introduced to the system and the terminal equipment on a gradual basis. Full student operation was achieved by mid-November with all students working at the terminals on a daily schedule of twenty-minute periods.

Since the student operations differ in some details for reading and mathematics, the activities of the two groups will be described separately.

(1) Reading: During the period from the opening of school in September to mid-October the program of pre-tests, which was begun in the spring, was completed by Dr. Mlodnosky. The following tests were given:

Short form of the Stanford Binet Revised Form LM.

Marianne Frostig Developmental Test of Visual Perception.

a) Eye-Motor Coordination

b) Figure Ground

d) Form Constancy

d) Position in Space

e) Spatial Relations

Bender Gestalt Test. Group Administered, Kopitz Scoring System.

Bender Gestalt Test. Individually Administered, Kopitz Scoring System.

The Spraings Multiple Choice Bender Gestalt Test. Individually Administered.

Belmont-Birch Test for Awareness of Left-Right Relations.

Peabody Picture Vocabulary Test.

The Illinois Test of Psycholinguistics: Auditory-Vocal Automatic and Visual motor Sequential Subtests.

	7:00	8:30	9:00	10:00	11:00	11:35	12:00	12:05	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	24:00	7:00
Monday	FE IBM	←	READ Students	→	SYS	←	MATH Students	→	← MATH Debug →	← READ Debug →	←	MATH Debug	→	← PRODUCTION →							
Tuesday	FE IBM	←	READ Students	→	SYS	←	MATH Students	→	Math Reports ←	SYSTEM →	←	READ Debug	→	← PRODUCTION	→						
Wednesday	FE IBM	←	READ Students	→	SYS	←	MATH Students	→	← MATH Debug →	← READ Debug →	←	MATH Debug	→	← PRODUCTION	→						
Thursday	FE IBM	←	READ Students	→	SYS	←	MATH Students	→	Math Reports ← SYS →	← READ Debug →	← SYS →	← READ Debug	→	← PRODUCTION	→						
Friday	FE IBM	←	READ Students	→	SYS	←	MATH Students	→	Math Reports ←	SYSTEM	⇒	← PRODUCTION									
Saturday									←	ANALYSIS	→										
Sunday																					PRODUCTION

Figure 1.

Systems Schedule

Advantage was taken of this period (September and October) to acquaint the children with various members of the project's staff with whom they would soon come in contact in the Laboratory. Staff members entered the children's own classrooms on a daily basis and read them stories. Every effort was made to minimize any feelings of strangeness which the children might experience in their new environment in the Laboratory.

During the last week in October the children were brought on a daily basis to the off-line teaching room in the Laboratory where they received early training in the use of headsets and the light pen. Charts and games were employed to acquaint the children with the kinds of tasks with which they would be confronted at the response terminal. One cathode ray tube and light pen was placed in the off-line teaching room on a temporary basis to give the children an opportunity to practice touching the figures and letters as they would appear on the face of the scope.

During the first week in November the children were brought into the terminal room for their first experience on-line on Tuesday and Thursday. During the second week the children worked at the terminals on Monday, Wednesday and Friday. From the third week of November onward the children were working at the terminals on a regular five-day schedule. Full twenty-minute sessions were given at the terminal from the very beginning; however, each student was accompanied by an adult proctor until approximately November 15. The number of proctors was then gradually decreased and by the third week of November the students were running with two teaching proctors and one machine proctor. The three proctors have comprised the on-line personnel for the remainder of this reporting period.

Every effort has been made to insure that the students can proceed through the material with a minimum of external help. In each problem block, however, there is fixed in the program an error limit which, if exceeded, produces a message on the proctor typewriter. The teaching proctor then has two alternative courses of action. She may (1) sign on the terminal with the student and give him aid on progressing through that problem block or (2) the student may be taken off-line for remedial instruction in the off-line instruction room. A remedial reading teacher

(a trained reading clinician who is thoroughly familiar with the lesson materials) is on duty at all times to assist children who are having learning difficulties. Very few children have been brought off-line for this type of instruction during the current reporting period. The remedial teacher has been used as a relief proctor in the terminal room and has provided structured learning activities for the children during times of terminal failure.

The proctors meet with the classroom teachers, Mrs. Ahern and Mrs. Brewer, and the principal, Mr. Rybensky, each week to exchange information and evaluate the children's progress during the week. A basis for the weekly evaluation is provided by the weekly student progress report which gives the location of the student in the lesson material and an index of each student's performance in each of the standard problem blocks. The index is a weighted running average which is stored in a series of counters for each student and printed out on the weekly progress report. Also included in the report is an accumulative total of the time spent on the system by each student.

The teachers as well as the students have maintained an enthusiastic attitude toward the system and the project during this reporting period. This attitude is best exemplified by one little first grader who, when his terminal had failed and he had been forced to work in the off-line classroom for the period, stoutly maintained that he was not going back to the classroom until he had had his turn on the terminal. The reaction of the students has been particularly encouraging in view of the fact that all of the students from both classrooms are being handled on the system, including children with rather severe emotional and learning disabilities.

It may be noted in Figure 2 that the anticipated spread of students through the course material has begun to develop through these early lessons.

Figure 2

		November					December		
		2	9	16	23	30	7	14 -	-16
Introductory Lessons	A	51							
	B		33	7					
	C		18	12	3	1			
Level I	1			31	37	21	6	1	1
	2				10	25	34	26	19
	3					3	6	15	13
	4						3	4	13
	5						1	3	0
	6							1	3
	7								1
	8								
	9								
	10								
	11								
	12								
	13								

The reading curriculum is organized around a main-line or core of problems and exercises for which each student must exhibit some degree of competency. The lessons average approximately 100 to 125 main-line problems apiece, excluding remedial loops, corrections, optimization routines, and accelerated branchings. At the beginning of Christmas vacation the maximum number of sessions for any child on the system was 24, disregarding illnesses, school vacations, and terminal and system failures. This amounts to 2 actual hours of instruction at the response terminal. The spread between the slowest and fastest student at the beginning of the Christmas vacation was 600 main-line problems after 8 hours of instruction.

a. Procedure - Classroom

(2) Mathematics: On October 3rd, 49 children from two of the first-grade classes at Brentwood School began coming to the CAI classroom. Each class was divided into two groups of ten to fourteen children; each group was in the Laboratory for twenty-five minutes on Monday through Friday afternoons between 12:30 and 2:30.

Until October 27 the groups' activities were limited almost entirely to the classroom which was conducted by two credentialed teachers working sometimes as a team and sometimes separately. During the week of October 3 preliminary counting tests were given to each child.[1] It was found that eleven children had inadequate counting skills. They were tutored individually throughout the month of October.

On October 4, 5, 10 and 11, half of each group spent classroom time on the playground with a psychologist (Dr. Rivka Eifermann of the Hebrew University, Jerusalem, Israel) who taught them simple games incorporating the concept of sets, including the empty set.[2] Later in the week, all children were asked the same series of questions about sets to determine whether those who had played the game had a better understanding of what a set was. The results were not conclusive.

During the week of October 21, groups of five children from each group were taken out of the classroom each day for individual testing. The tests, which were designed by the School Mathematics Study Group, were administered by CAI staff, and results were compared with the results obtained by the School Mathematics Study Group in their studies of culturally-disadvantaged children.[3] The SMSG post-test will be given at the end of the school year.

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[1] Ten questions were asked; one to ten blocks were used. Sometimes the tester would display some blocks, and the child would tell how many blocks were displayed. On alternate questions, the child was asked to count out a given number of blocks.

[2] Most popular was a jump rope game in which two children swung the rope back and forth. Children who wished to jump over had to call "a set of . . ." followed by names of their classmates and/or themselves. When a child called out "the empty set", no one was supposed to jump.

[3] Leiderman, Chinn and Dunkley, SMSG Reports: No. 2 The Special Curriculum Project: Pilot Program on Mathematics Learning of Culturally Disadvantaged Primary School Children.

b. Procedure - Terminal Room

On October 27 class time for Group IV was divided into two period of tem minutes each.[4] Each period half of the group (five children) went into the terminal room for computer-assisted instruction, while the other half remained in the classroom with one of the teachers. In the terminal room, each child was assigned a proctor who helped him get started and monitored the entire lesson which lasted for three to five minutes. All children were faded[5] after the first lesson. On November 1 the children in Group I, II and III did the first lesson under the close supervision of a proctor. On that same day the children in Group IV worked for 15-17 minutes. The seven proctors did not monitor these children, but merely observed them as they worked. The children were attentive throughout, and did not seem to tire of the work. At the end of the 15 minutes one child had nearly completed Book 1. During this period, however, proctors detected some errors which were especially confusing to children new to machine work. (In one case, an audio tape "ran-away" and played on, independent of the problems being solved. In a few cases, the computer mistakenly identified a correct answer as incorrect.) Because of these errors it was decided that the children should come into the terminal room in groups of seven or less so that each child could be monitored by one of seven proctors until the error problem was minimized.

On November 7 a regular schedule for children in the terminal room was established. Groups continued to be divided into two ten-minute periods, with seven proctors each assigned to listen with one child. An additional proctor took care of the proctor typewriter and loaded audio tapes at the beginning of the day or whenever a child transferred from

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[4] *We chose Group IV for this first experimental run because they were the smallest group and the most cooperative in the classroom.*

[5] *The FADE command, which is input by a proctor, causes a student station to be signed off as soon as the student completes the current lesson.*

one book to another.[6] The fade command allowed each child to finish the lesson he was working on and return to the classroom before the ten-minute period was over.

By November 9, most children were starting their lessons without help from a proctor. A child would find the CRT displaying his name, sit down, put on his earphones, and start the program by touching the display with his light pen. Those who did not start their program by themselves usually waited for a proctor's go-ahead, not because they did not know how, but because they either wanted attention or were reluctant to begin without an authority's approval.

If a child failed to meet the established criterion for a lesson, his proctor, responding to instructions typed on the proctor typewriter, would assist him, recording all pertinent information on a special sheet to be handed over to the master proctor at the end of the day. Notes from these sheets were used both to inform classroom teachers of each student's progress and as aids for revision of the material.

The children quickly learned that a CRT display of the words "you have been signed off" meant the end of the day's lessons. Most children put away their earphones and left the terminal room quietly; those who did not were either reluctant to leave, or, again, wanted attention from the proctor.

The above schedule was maintained until December 12, when it was changed for the following reasons:

i. Errors in the programmed lessons had been reduced significantly by a change in coding. Children had also become more familiar with the machine and its eccentricities and were less confused by errors that did occur.

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[6] Each book has a corresponding audio tape; thus when a child has finished one book his audio tape must be changed before he can continue. For this reason children were not given permanent stations, but were assigned stations according to what book they were currently working in. Pre-scheduling for seating was time-consuming, but substantially reduced on-line time otherwise required to load and unload audio tapes for the eight periods.

ii. A proctor's presence had become harmful to some students; some were embarrassed when they knew an adult was watching them make mistakes; some were becoming reliant on a proctor's assistance and would look to him for approval before making a response; some had come to think of a proctor as an integral part of machine work and would not start without being monitored.

iii. The short ten-minute periods made any kind of classroom activity difficult.

iv. The short periods were also unsatisfying to those students who had time for only one lesson before they were signed off.

There were several advantages in having a proctor for each child. The proctors could interfere immediately whenever a machine error caused confusion to a student. The students' interaction with the programmed material could be observed closely and notes which would be invaluable when making revisions could be written in some detail. Also, the proctors could be more effective in assisting a student who had failed criterion for a lesson.

The advantages of individual proctors were overruled by the disadvantages listed above. On December 12, therefore, the previous schedule was changed and only three proctors remained in the terminal room; two proctors provided individual help while a third supervised the room as a whole and dealt with discipline problems. A fourth proctor's duties included changing audio tapes and dealing with minor systems difficulties. Each child was assigned a permanent station and the groups were no longer divided into two periods. Seven to ten children worked on-line for twelve to fifteen minutes; fade time was standardized by the clock to assure that all children were back in the classroom by a specified time. Two to four children remained in the classroom each day on a rotating basis, thus allowing more time and space for valuable classroom instruction and activities. The current schedule has been very satisfactory for both the proctors in the terminal room and the classroom teacher.

c. Curriculum - Classroom

Prior to starting computer-assisted instruction, children worked in the classroom with one or two teachers. The program for the first two weeks included one-to-one matching with objects and learning to verbalize the relationships of "more than", "less than" and "same as". Children had the most difficulty with "less than", although some responded better when the words "not as many" were used. Some class time was spent introducing the written words "yes" and "no" in preparation for programmed lessons whose format required a knowledge of these words. Work with color recognition and practice in copying designs with strips of colored paper was presented to test and develop spatial orientation and to encourage skill in following directions.

In the middle of October, all groups began work with sets.[7] Topics covered were: definition of a set; making sets with concrete objects; the concept of set membership using the words "the things in a set"; common properties of members in a set, i.e. color, things to play with etc.; the empty set. Some work was done on equal sets and union of sets. During this time, children also practiced counting objects from one through nine and drawing a given number of objects on paper.

After computer-assisted instruction was started, the classroom teacher introduced the idea of counting starting from numbers other than one, and finding the number that was "one-more". As soon as the children had had programmed lessons on sets, further classroom instruction on sets was presented with flannel board pieces using braces and equal signs and union signs. During the month of December, the classroom teacher gave "story" addition problems to all classes but Group III. Groups also did work in measuring objects in the classroom with pieces of string and popsicle sticks. The children were introduced to some mathematical games, e.g. dominoes, set diagrams, to which they responded with enthusiasm. In preparation for

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[7] In all facets of the material, lessons for Group III were less sophisticated since these children were slow in learning new concepts; this was caused in part by their unruly behavior in the classroom.

the time when children would come from the terminal room into a classroom in which no specific activities had been planned for them, several sessions were spent in which children chose games (cubes, pegboards, parquetry blocks, construction toys) and played with them individually or in pairs. These sessions were successful for the most part, although lack of space presented a major problem.

d. Curriculum - Terminal Room

In the terminal room, children began by becoming acquainted with the rudimentary aspects of machine work via the lessons in Book 1. Two of the lessons (a lesson on touching with the light pen the object pointed to by an arrow, and a lesson concerning the words "top", "middle" and "bottom") caused minor difficulties for the children but for the most part the material was easy. The response of students to the first few lessons varied. Group IV was very enthusiastic about them in the classroom, whereas children in the other groups were fairly noncommittal. In all cases, however, the children were not so much interested in what the machine did per se (they seemed to take it for granted) but in what they made the machine do. ("I made the dog get his bone", "I touched the bunny and made him go to his friend.")[8]

By November 14 most students were working in Books 2 and 3. Set lessons in these books covered introduction to sets and set terminology, matching equal sets, and union of sets in equations. Response to these lessons was favorable although lengthy audio messages in some taxed the attention span of many children. In a later book there were several rather difficult lessons on balancing set equations; these lessons were reserved for the more gifted children but they could have been much harder as these students had little or no difficulty solving the problems.

Scattered throughout the material were several lessons in counting through 4. These lessons were presented in a "yes-no" format (i.e. "are there four goats?") because the children did not yet know numerals.

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[8] This focus of interest remains the same even in the later lessons - a change of display on the scope does not hold a child's attention for long if he did not bring it about.

Children had almost no difficulty counting the displayed objects, but found the format difficult, especially for questions requiring a "no" answer. Most counting lessons were presented with color film displays.

Geometry lessons in Book 4 introduced the children to circles, squares, triangles and line segments, with practice in counting these figures and learning to distinguish them from each other and other figures. These lessons required the children to learn a new format in which answer boxes were displayed on the CRT opposite figures or rows of figures on the film projector. A few students found this confusing at first, but caught on quickly after a short verbal explanation. The children liked the geometry lessons, which seemed to hold their attention more consistently than any of the other blocks of lessons.

Only a few students had begun the lesson on N-notation and numerals before the Christmas recess. As they are the fastest students, they experienced no difficulty with the material.

e. Performance

Throughout the month of November and December, the children's work on-line was interrupted by three major systems breakdowns during which one group on November 7, all groups on November 10, and two groups on November 30 were unable to work on the machines. In addition to customary school holidays, children did not come to the lab at all during the week of Brentwood Parent Conferences (November 14-18). With the exception of those groups mentioned above, children have worked on the machines for a total of 23 days up to December 16.

The progress of the children in the programmed lessons is shown in the following chart.

	Oct. 24 -Oct. 29	Oct. 31 -Nov. 4	Nov. 7 -Nov. 11	Nov. 14* -Nov. 18	Nov. 21 -Nov. 25	Nov. 28 -Dec. 2	Dec. 5 -Dec. 9	Dec. 12 -Dec. 16
Book 1	49	17	4	4				
Book 2A		2	39	39	8		1**	
Book 2B		6	6	6	20	4		
Book 3A					21	20	7	1
Book 3B						17	14	4
Book 4						8	18	11
Book 5							8	23
Book 6A							2	6
Book 6B								4
Book 6C								1

*During the week of Brentwood Parent Conferences (November 14-18) no children came to the laboratory for mathematics lessons.

**This child entered school on December 6.

During the two months of constant experimentation with details of scheduling and procedure, the children have continued to respond to the programmed lessons with gratifying enthusiasm. Cases of misbehavior in the terminal room are limited to three or four students who tend to become unruly whenever a lesson bores them or when it is too difficult. In contrast to their experience in the classroom, these children have found it difficult to distract others around them, and thus their antics are confined to playing with the keyboard or removing their earphones.

Children who are babyish and immature have become much more self-reliant in their work in the terminal room. Cries of "Who's going to help me?" and "I can't do this" are rarely heard any more, and the performance of these children has been exemplary.

Although some children express an interest in what others are doing (especially when they see someone with film displays) the only sign of competition that exists so far is that expressed by "How many happy faces did you get?" Thus the student who is still in Book 3 can compete with his classmate who is in Book 6.

The programmed lessons are presented in such a way that it is easy for a child to succeed in at least some facet of the material. If a child has difficulty in the more complicated set equations he has a chance to redeem himself in the geometry lessons which move quickly and are simple in concept. Many of these children have difficulty verbalizing and responding to oral instruction. The problems they are asked to do, while mentally taxing, are not complicated by the added difficulty of verbalization. Verbal instruction by way of audio messages is held to a minimum and will be used even less in later books and in revised material.

C. Data Reduction. Specifications of basic data reduction routines and definition of sorting requirements have been completed. Programming and checkout of these routines are progressing rapidly. The first data print-outs are scheduled for January, 1967.

D. Visitors. Beginning in July, 1966, plans were formulated to accommodate interested visitors to the Stanford-Brentwood CAI Laboratory. Throughout the summer months (July, August, and September) visitors were taken on a tour of the Laboratory whenever they appeared there. However, it was noted that many of the special interests of the visitors could not be accommodated in such an organizational plan, so the decision to go to regularly pre-scheduled visits was instituted. This latter plan allowed the staff of the school and laboratory to plan on being available when special interests were requested by visitors. Pre-scheduling of visitors also insured sufficient time for observation, questions, and interacting with the Laboratory's staff without overcrowding the visiting areas.

Although top priority in the project is to the ongoing operation of the laboratory, careful attention has been given to accurate, complete, and authoritative interaction with those who visit the Laboratory. Whenever possible, the special interests of the individuals or groups visiting have been taken into account and the experts from the project (programming, systems, data reduction, mathematics curriculum, reading curriculum, in-service education, school administration, etc.) have been made available

for discussions. Much of this has been made possible through the pre-scheduling and centralization of all requests for visits. In order to insure the same high standard of dissemination of information about the project to all who visit, one person has been given the responsibility for coordinating this function of the project.

Changes in the scheduling of visitors have been numerous because of the very heavy demand to view the project. Throughout the months of October, November, and December scheduling was altered to facilitate increasing numbers of visitors. Special demonstrations have been made available on Saturdays, Sundays and during the evening hours to accommodate such varied interest groups as: Brentwood parents, District teachers and Boards of Trustees, a national computer conference held in the Bay Area, a Boy Scout Troop, national television and news, and university psychology classes. Three regularly scheduled visiting times soon gave way to four. Large special interest groups were scheduled at other times in order to keep the pre-scheduled times available for up to 12 individual visitors, or several small groups of two or three. All School-time visits have provided the visitor with an opportunity to view (through special two-way mirror) at least one class of children working with the terminal equipment.

Besides offering each visitor a rather inclusive question-answer brochure concerning the Stanford-Brentwood CAI Laboratory, a recent addition has been the limited use of a special low priority "extra" terminal. This terminal is available for visitors' use only if its component parts are not needed to insure optimal operation of the program for the children. From time to time handouts concerning the computer operating system, computer-assisted instruction, schedules of national and local television programs pertaining to the project, and national periodical sources about computer-assisted instruction and/or the Stanford-Brentwood CAI Laboratory have been made available to visitors.

As computer-assisted instruction is programmed to take into account more and more of the individual backgrounds and interests of the learners, so, too, must those who dispense information about computer-assisted instruction installations. In the first six months of operation, the Stanford-Brentwood CAI Laboratory had had visitors on every day of the week, during all hours of the normal eight-hour day, during noon and dinner hours, in the evening and night, and in the morning before daily class schedules have begun. The usual 50 to 70 visitors per week have increased to more than 100 on a number of occassions. National and international educators, corporations, and research interests have been represented by visitors to the project.

Systematic records concerning those who visited the project were not initiated prior to October 1966, and it was not until November that procedures were established to insure a more accurate accounting of all visitors to the project regardless of the time that they visited. Even so, the diversity of backgrounds of those who visited the Laboratory between October and January can be somewhat described by the following listing of 440 visitors:

Groups Represented (number of individuals):

Public schools: Superintendents, Curriculum Coordinators, Consultants, Principals, Teachers, Special Education Teacher, etc. (107)

Corporations, Companies, Industrial firms, etc: Presidents, Board Chairmen, Research Specialists, Sales Representatives, etc. (58)

Colleges and Universities: Presidents, Administrators, Professors, Research Specialists, etc. (64)

Parents, interested citizens, (51)

Students: High School, College, University, Graduate, Student Teachers, etc. (49)

State and County Departments of Education: Superintendents, Consultants, Research Specialists, Curriculum Coordinators, etc. (16)

Publishers: Presidents, Senior Vice-Presidents, Vice-Presidents, Curriculum Specialists, Sales Representatives, Editors, etc. (15)

School Board Members and their Committees. (13)
Governmental Agencies: USOE, Bureau of Indian Affairs, Regional Laboratories, etc. (2)
School or Educational Research Agencies. (8)
Consultants to Educational Systems. (4)
Military: Annapolis, West Point, Air Force Academy, USAF, etc. (7)
Associations, Clubs. (5)
Architects (5)
Audio-Visual Suppliers: Sales Representatives, Researchers, etc. (3)
State Superintendents of Public Instruction. (2)
National Offices of Education: Foreign Governments (2)
Correspondents, News Writers, Television Personnel, Radio Personnel, etc. (22)*

Some of the publications which have included articles mentioning the Stanford-Brentwood CAI Laboratory are: Saturday Review, Fortune, Scientific American, Time, Newsweek, Barron's Weekly, Education Digest, Family Circle, Nation's Schools, Southern Education Report, and numerous newspapers.

Visitors from Australia, Brazil, Canada (Alberta, British Columbia, and Ontario), and Rhodesia have seen the Laboratory.

Visitors to the Stanford-Brentwood CAI Laboratory have shown interest in every phase of the operation from financing through children's attitudes toward this mode of instruction. By having personnel available from the Brentwood School, the Mathematics Reading Curricula (writers, programmers, artist, etc.), Data Reduction, Systems Operation, In-Service Education for Teachers, etc., most visitors have been able to get the information they have sought. A conscious effort to obtain feedback from visitors has helped this phase of the Stanford-Brentwood CAI Laboratory to steadily increase its effectiveness and usefulness to visitors.

*This category represents United Press International, Associated Press, American Broadcasting Company--TV(national), Columbia Broadcasting System - TV(national), KTVU-TV Oakland, KGO-TV San Francisco, KRON-TV San Francisco, KQED-TV San Francisco, KPIX-TV San Francisco, KCRA-TV Sacramento, KFRC-Radio San Francisco, KEWB(KNEW)-Radio Oakland, Time Magazine, Life Magazine, Chemical and Engineering News, Southern Education Report, Newsweek Magazine, Palo Alto Times, Stanford University Press, School Product News., etc.

E. Reading Curriculum. The major focus of attention for this reporting period has been on the final preparation and actual use by students of the early lessons of the reading curriculum. However, the writing, art preparation and audio preparation for materials for the later levels has been continuing. The major writing activity has been concentrated on continuous discourse materials (narrative and expository material to be read by the students) and the preparation of sections dealing with polysyllabic words.

A detailed description of the reading curriculum, A Reading Curriculum for a Computer Assisted Instructional System, The Stanford Project, was prepared and forwarded to the U.S. Office of Education in August. A copy of the document is appended to this report for convenient reference.

A program has been prepared which runs on the Burroughs 5500 System which creates and updates a complete dictionary of all words and verb forms available by lesson and level in the reading curriculum. This program also serves as a final editing pass through the lesson materials to insure that no words or patterns have been included which have not been previously taught.

Another program, also running on the Burroughs 5500 System, has been written which will furnish a complete description of the reading materials in terms of the number of exposures to words and patterns and the number of responses which are made by the students. These exposures and responses are counted for main line, accelerated, and remedial loops, and are calculated for both initial and final consonant clusters and medial vowels besides the complete vowel-consonant and consonant-vowel-consonant pattern. The program can also provide a frequency count for individual words which are of interest.

Preliminary plans for the revision of the introductory lessons are now under way, based upon the student performance in those lessons through the months of October and November.

F. Mathematics Curriculum. The preparation of the mathematics curriculum material has continued during the entire reporting period. The major effort has been in debugging material, although curriculum writing and coding have also continued, as have preparation of art work, films and audio tapes.

2. Activities Planned for the Next Reporting Period. Curriculum development, coding, art work, audio recording, and debugging of lesson material will continue during the next reporting period. As the system achieves greater stability, small samples of students other than first-graders will be run on a daily basis. These will include bright and capable kindergarteners as well as remedial second-grade students.

Plans for the operation of the laboratory during the school year 1967-68 will be discussed with the classroom teachers, the administration, the school board, and the Institute staff. High priority will be placed on plans to expand the laboratory building in order to house an additional 16 student response terminals.

A major effort during the next reporting period will be the sorting, summarizing and interpreting of student response data.

3. Staff. Mrs. Anne Nicol left the staff in August to join her husband in Hawaii, Miss Marilyn Cox, part-time graduate student, was transferred to another project. Miss Briana Burns and Mrs. Mary Page have joined the staff; they are both experienced teachers who act as proctors and also help with curriculum development. Two new coders, Mrs. Rosemary Coates and Mr Gill Johnson, have joined the staff.

Dr. Duncan Hansen has left the project to assume a position at Florida State University at Tallahassee, Florida. His position has been filled by Dr. Hal Wilson who has been associated with the project since 1964. Miss Karen Alexander left the project to continue work towards a degree and has been replaced by Miss Cherie Hesse. Mrs. Susan Perry has rejoined the project as editor of the reading curriculum writing group. Mrs. Meredith Smith, fiction supervisor, resigned due to pregnancy. Miss Beth Jensky and Miss Sybil Seldorff have joined the staff as artists for the reading group.

Mr. Lee Griffiths has left the project to accept a position with IBM. Mr. Stan Puryear has joined the staff to replace Mr. Griffiths as supervisor of the Brentwood Laboratory with the additional responsibility of heading the data reduction group. Mr. Bruce Freed has been promoted to Chief Systems Programmer.